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## Rhythmic And Metric Structure In Alberto Ginastera's Piano Sonatas

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RHYTHMIC AND METRIC STRUCTURE IN  
ALBERTO GINASTERA'S PIANO SONATAS

by

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B.M. Stetson University, 2008

A thesis submitted in partial fulfillment of the requirements  
for the degree of Master of Arts in Music  
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## ABSTRACT

Alberto Ginastera (1916-1983) was one of the leading South American composers of the twentieth century. Born in Argentina at a time when his country was striving to achieve a national identity and culture, Ginastera was recognized for combining the techniques of Western European art music with elements of Argentine folk music. His piano sonatas, composed during both his early and late periods, serve as excellent examples of this cultural synthesis throughout the course of his career.

The *Sonata No. 1 for Piano Op. 22* (1954), *Sonata No. 2 for Piano Op. 53* (1981), and *Sonata No. 3 for Piano Op. 54* (1982) have been analyzed and discussed in recent scholarship. Theorists have identified Western techniques such as sonata-rondo form, serialism, and symmetry in his compositions. Yet, when addressing rhythm, scholars have focused primarily on highlighting the Argentine dance or Amerindian rhythm that the music exemplifies and have neglected to apply Western analytical tools for analyzing rhythm.

The goal of this paper is to approach rhythm and meter in the piano sonatas from a new perspective in order to identify Ginastera's Western European musical techniques. Attention will be given to Ginastera's use of and denial of metric hierarchy and periodicity. The paper will also focus on consonant and dissonant rhythms in the piano sonatas, as well as additive and subtractive rhythms.

Because any discussion of rhythm and meter in Ginastera's music cannot ignore its nationalistic origins, the paper provides an introductory chapter that discusses Argentine dance

rhythms. However, the bulk of the paper aims to provide analyses from a Western art music viewpoint that illustrate Ginastera's compositional manipulation of rhythm and meter.

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## CHAPTER 1: INTRODUCTION

A native of Buenos Aires, Alberto Ginastera (1916-1983) was one of the most innovative Argentine composers of the twentieth century. Following a generation of composers who sought a national musical idiom, Ginastera not only helped establish the use of Argentine musical techniques, but also combined those national techniques with contemporary European musical practices.<sup>1</sup> Ginastera's mastery of combining these styles has been the focus of many recent scholars' research, most notably Gilbert Chase, Deborah Schwartz-Kates, and David Wallace. All three have addressed Ginastera's use of form, melody, and harmony from a Western perspective. Yet, because Ginastera's use of rhythm is largely a reflection of Argentine folk music, it is most often addressed in that vein. However, Western analytical techniques can also shed light on Ginastera's rhythmic and metric structures. This paper aims to approach rhythm and meter in Ginastera's piano sonatas from a Western perspective in order to gain a better understanding of his rhythmic and metric techniques. Before such an analysis can be discussed, one must have an understanding of Ginastera's music, and its role in Latin American musical history.

Latin American ethnology is comprised of three groups: Amerindian,<sup>2</sup> European, and African. The Amerindian culture, the first to occupy the area, most likely came to the Americas thousands of years ago during two ice ages. The ice ages caused the oceans to recede, allowing new land to surface between Siberia and Alaska for nomadic hunters to cross. In the sixteenth

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1. Gilbert Chase. "Alberto Ginastera: Argentine Composer," *The Musical Quarterly* 43/4 (Oct., 1957), pp. 444-45.

2. Gilbert Chase describes 'Amerindian' as "All that pertains to aboriginal culture [in Latin America] before the coming of Columbus" in Gilbert Chase. *A Guide to the Music of Latin America*, 2<sup>nd</sup> ed. (Washington D.C.: The Pan American Union and The Library of Congress, 1962), p. 9.



century, as various countries colonized Latin America, European and African influences began to take root alongside the established Amerindian cultures. The term “Latin America,” therefore, is somewhat misleading. While the term “Latin” does specify the southern European countries that colonized the region, it does not account for the Amerindian and African influences. Therefore, it should be noted that although the term “Latin America” continues to be used for convenience, study of Amerindian and African cultures is imperative to understanding Latin American way of life.<sup>3</sup>

When Christopher Columbus landed on Samana Cay<sup>4</sup> in 1492, approximately fifteen million people, representing 1,492 languages, already inhabited the South American continent; twenty-six million people occupied Central America and the Caribbean. The Amerindian culture could be divided into numerous subcategories.<sup>5</sup> Among those groups were the Mayans in present day Guatemala, Aztecs in present day Mexico, and the Incas in present day Peru.<sup>6</sup> Prior to colonization, evidence suggests that the music of these native groups was highly cultivated. The preservation of indigenous instruments and written observations from European settlers provide insight into the musical life of these Amerindian cultures.<sup>7</sup>

When the first European settlers reached what is now Guatemala, Mayan society had already been divided into smaller kingdoms, preventing settlers from writing descriptions of Mayan musical culture at the height of its civilization. However, because the Mayans began

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3. Dale Olsen and Daniel Sheehy, editors. *The Garland Handbook of Latin American Music*, 2<sup>nd</sup> ed. (New York: Routledge, 2008), pp. 2, 9-11.

4. present-day Bahamas

5. Dale Olsen and Daniel Sheehy, editors. pp. 9-10.

6. A description of all of the indigenous people living in Latin America would be exhaustive. I have chosen these three groups because they were the most influential to Ginastera's music.

7. Juan Orrego-Salas. *Involvement with Music: Music in Latin America* (New York: Harper's College Press, 1976), pp. 1-2.

recording their own history in the sixteenth century, some knowledge of their culture has been retained. These sources devote ample attention to the Mayan arts. Embedded in Mayan rituals, the arts played an important role in maintaining a peaceful relationship between the human and spiritual worlds.<sup>8</sup> According to Mayan belief, because music was a gift that had been passed down from their ancestors, the music could attract their spirits. Because they believed that their ancestors affected their daily lives, their ancestors' music was critical to mankind's prosperity.<sup>9</sup>

Unlike the Mayans, the Aztecs required a high level of training from individuals who pursued careers in music. Music was always used in conjunction with rituals, therefore musical performances were held to an extremely high standard. Under the caste system, only the most experienced and talented musicians were allowed to perform. Such musicians were highly esteemed by their community. Yet, because rituals were considered offensive when not executed flawlessly, a simple mistake by one of the musicians often led to the death penalty.



Rituals and other public group performances were more common in Aztec society than solo performances. The reason for this preference was twofold. First, to the Aztecs, music was employed for communal expression as opposed to individual expression. European settlers admired Aztec musical expression; often Europeans, who were unfamiliar with the native language, were capable of understanding the meaning behind Aztec songs. Second, the 260-day religious calendar required specific music for each communal ritual.<sup>10</sup>

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8. Dale Olsen and Daniel Sheehy, editors. pp. 216-218.

9. Ibid., pp. 226.

10. Robert Stevenson and Arturo Chamorro. "Aztec music," *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/01636> (accessed October 8, 2010).

For the Incas, the combination of music and dance was a part of daily life.<sup>11</sup> What is surprising, however, is that each province within the Inca empire had its own set of songs and dances that was rarely shared with its neighboring provinces. The music of these regions was even further divided into popular music and music for the upper class, yet, it should be mentioned that today's indigenous music of the Andean region does have certain general characteristics in common.<sup>12</sup> Of particular interest are two frequently used rhythmic cells. The  rhythm is derived from *huayno*<sup>13</sup> and is associated with the native *carnavalito* dance.<sup>14</sup> The  rhythm is a derivation of the first rhythm. These rhythms are often employed with slight variation if sections of extensive repetition occur.<sup>15</sup>



**Figure 1: Two common Inca rhythms**

The traditions and instruments of the Incas, Mayans, and Aztecs attest to the high level of musical development in their cultures. Yet, the natives were not immune to the influence of the European settlers and the African slaves who were brought with them. Spanish and Portuguese

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11. Cesar Bolanos. "Inca music," *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/13749> (accessed October 8, 2010).

12. Dale Olsen and Daniel Sheehy, editors. pp. 439.

13. The native music of Peru

14. Francis Pittman. *A Performer's Analytical Guide to Indigenous Dance Rhythms in the Solo Piano Works of Alberto Ginastera* (D.M.A. Diss., The University of North Carolina at Greensboro, 2006), pp. 29n, 28-29.

15. Thomas Turino. "Quechua and Aymara," from *The Garland Encyclopedia of World Music Volume 2: South America, Mexico, Central America, and the Caribbean*. edited by Dale Olsen and Daniel Sheehy (New York: Garland Publishing, Inc., 1998), p. 216 figure 5.

colonists impeded the native way of life by implementing their own political, religious, social, and educational customs. Although Amerindian cultures eventually held their place in Latin American culture, they did not prosper during the early stages of colonization.<sup>16</sup> Alongside the growth of European colonies arose a racially-based caste society. Many Amerindians became serfs under Spanish governing. Spanish settlers felt that, through forced labor, Amerindians could repay the settlers for their gifts of civilization and Catholicism.<sup>17</sup>

The Catholic Church was a leading force in the colonial Latin American culture. It spread primarily as a result of two missionary groups: the Franciscans in North and Central America, and the Jesuits in South America. Missionaries applauded Amerindian efforts to imitate Catholic practices, especially those that were related to music. One of the most successful means of conversion to Catholicism was allowing Amerindians to take part in the musical activities of the church. Church music as late as the eighteenth century revealed coexistence of Amerindian and European musical styles, and many Amerindian dances were included in religious services.<sup>18</sup>

While the Catholic Church held a central role in culture during the colonial period, its power in Latin America was weakened by the romantic and independent movements of the late eighteenth and nineteenth centuries. The highly esteemed role of sacred music in the colonies was weakened by Napoleon's invasion of Spain and Portugal in 1807. Colonists disapproved of Napoleon's authority in Spain and Portugal and began to look elsewhere for cultural influences. Dances popular in France such as the mazurka, minuet, polka, waltz, tarantella, and contredance

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16. Juan Orrego-Salas. pp. 1, 4-8.

17. Fiona Wilson. "Indians and Mestizos: Identity and Urban Popular Culture in Andean Peru," *Journal of Southern African Studies* 26/2 (June, 2000), pp. 240-243.

18. Gerard Béhague. *Music in Latin America: An Introduction* (Englewood Cliffs: Prentice-Hall Inc., 1979), pp. 1-5.

found their places in Latin American salons.<sup>19</sup> Italian opera reached Buenos Aires in the eighteenth century and began to flourish as a result of extensive Italian immigration. In the nineteenth century alone, ten opera theaters were built.<sup>20</sup>

As the nineteenth century progressed, French and Italian influences were further engrained into Argentine musical culture through education. It was common for Argentine composers to study in Paris or Italy. French Impressionism, Italian opera, atonality, and serialism were all familiar to the Argentine composers. Upon returning to their native country, they were faced with the challenge of writing European music that reflected their Argentine nationalist beliefs.<sup>21</sup>

The synthesis of European and native musical styles in Argentina could be attributed mostly to the country's need for unity.<sup>22</sup> After the region gained independence from Spain, the territory was culturally divided between the "civilized" coast and the rural inland. Domingo Faustino Sarmiento (1811 – 1888), a nationalist writer, paved the way for unification in Argentina. In his writings, Sarmiento depicted a gaucho, an uncivilized cowboy, in a civilized setting. He felt that the only way to unify the country was for its citizens to reject their barbaric lifestyles and embrace civilization. Over time the enlightened gaucho became the cultural symbol for the national Argentine style.<sup>23</sup>

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19. Juan Orrego-Salas. pp. 8-10.

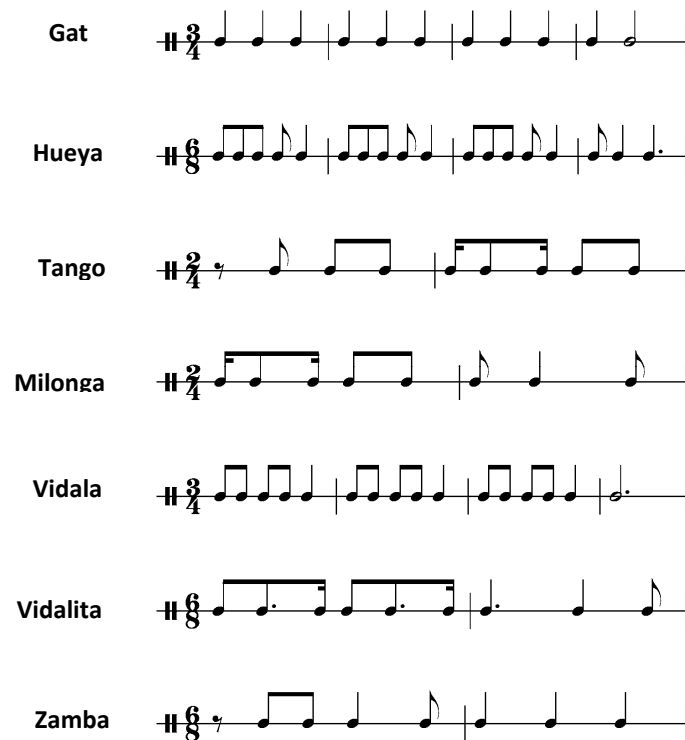
20. Gerard Béhague. pp. 106-107.

21. Gilbert Chase. *The Musical Quarterly*. pp. 7-11.

22. Deborah Schwartz-Kates. "Alberto Ginastera, Argentine Cultural Construction, and the Gauchosco Tradition," *The Musical Quarterly* 86/2 (Summer, 2002), p. 253.

23. *Ibid.*, pp. 249-250.

In terms of music, the gauchesco<sup>24</sup> tradition resolved the urban and rural dichotomy by implementing folk characteristics into a European structure. Julián Aguirre (1868 – 1924<sup>25</sup>) was among the first group of Argentine composers who were interested in crafting a national musical idiom. Aguirre established a system of rules through which Argentine composers could express their nationality within their music. The use of Argentine dance rhythms was a vital component to his system.<sup>26</sup> *Figure 2* illustrates some of the Argentine dance rhythms that were used.



**Figure 2: Argentine Dance Rhythms<sup>27</sup>**

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24. Schwartz-Kates defines gauchesco as a “cultural, literary, and ideological movement...which upheld the gaucho (the landless native horseman of the plains) as a symbol of the Argentine nation.” Deborah Schwartz-Kates. *The Musical Quarterly*. p. 248.

25. Gilbert Chase, “Creative Trends in Latin American Music-I,” *Tempo, New Series* 48 (Summer, 1958), p. 29.

26. Deborah Schwartz-Kates. *The Musical Quarterly*. pp. 255-256.

27. Nicolas Slonimsky. *Music of Latin America* (New York: Thomas Y. Crowell Company, 1945), p. 78.

Foreigners today often label the *tango* as the national dance of Argentina. While the country does not have a definitive national dance, Argentines give the title to the *malambo*. The *malambo* is the dance of the gauchos, and thus, only men are allowed to participate. Two men stand opposite one another as opponents and take turns outshining the other's dance skills. The tournament is a lengthy event that can last an entire night. The dance is in a 6/8 time signature at a moderately fast tempo.<sup>28</sup> Figure 3 illustrates some common *malambo* rhythms.



Figure 3: Common *malambo* rhythms<sup>29</sup>

28. Gilbert Chase. *The Musical Quarterly*. pp. 554n, 554-556.

29. Ibid., p. 455.

A complete survey of Aguirre's codified system is too exhaustive for the purposes of this paper. However, it should be mentioned that this system of codes allowed his music to exemplify Argentina's desire for nationalism. The generations of composers that followed him looked to his music to understand and elaborate on the Argentine musical style.<sup>30</sup>

It was at this point in Argentine history that Alberto Ginastera (1916 – 1983) began to contribute to the country's musical style.<sup>31</sup> With a paternal grandfather from Spain and a maternal grandfather from Italy, Ginastera's ancestry exemplifies the Argentine heritage. He was born in Buenos Aires into a family with no musical background. At age seven, Ginastera began his first music lessons; by age twelve he entered "Williams Conservatory" in his hometown. Following his studies at the conservatory, Ginastera attended the National Conservatory of Music. One of his principal teachers, José André, spent time in Paris studying at the Schola Cantorum. From José André, Ginastera was introduced to French musical styles that deeply impacted the composer.<sup>32</sup>

1941 proved to be an important year for Ginastera both personally and professionally. In December, he married Mercedes de Toro. Ginastera also accepted a position at the National Conservatory of Music as the composition professor. Even during his early years as a professor at the conservatory, Ginastera began to gain recognition as a nationalist composer.<sup>33</sup>

Ginastera did not escape the political struggles of the 40s and 50s. After working on the faculty at the San Martín National Military Academy for four years, he was forced to resign by

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30. Deborah Schwartz-Kates. *The Musical Quarterly*. p. 260.

31. *Ibid.*, p. 255.

32. Gilbert Chase. *The Musical Quarterly*. pp. 439-440.

33. Deborah Schwartz-Kates. "Alberto Ginastera," *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/11159> (accessed October 8, 2010).



the Perónist regime<sup>34</sup>. The newly elected President did not condone Ginastera's support of civil liberties. In 1942, Ginastera received the Guggenheim grant. However, because of the war, Ginastera delayed his trip to the United States until 1945. The trip proved to be a fruitful experience regardless of its postponement; Ginastera visited Juilliard, Yale, and Harvard. In 1948 at the National University of La Plata, Ginastera directed and organized the music conservatory and theater. Yet, in 1952, the Perón government demanded that he resign from his position for a second time.<sup>35</sup>

Despite the political obstacles, Ginastera's career thrived. His compositions, including his *Piano Sonata no. 1* (1952), continued to gain recognition. For additional financial support, Ginastera also wrote film music. Schwartz-Kates suggests that, like Copland, Ginastera had a second motive for composing film music. The genre provided a medium for communication that reached not only the musical audience, but also the general public. Such a communication would be compelling to a composer who was interested in making advances in an Argentine musical identity.<sup>36</sup>

Following the premiere of his *String Quartet no. 2* by the Juilliard String Quartet, Ginastera was able to write solely by commission. The quartet showcased not only Ginastera's

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34. Juan Perón (1895-1974) was elected President of Argentina in 1946, and founded the Perónist movement. He pushed government control over the economy in hopes of improving lives of the working class. To assure his re-election, Peron wrote a new constitution that suppressed civil liberties. Thomas McGann. "Juan Perón," *Encyclopedia Britannica*, <http://www.britannica.com/EBchecked/topic/452378/Juan-Peron> (accessed January 31, 2011).

35. Deborah Schwartz-Kates. "Alberto Ginastera," *Grove Music Online*. <http://www.oxfordmusiconline.com/subscriber/article/grove/music/11159> (accessed October 8, 2010).

36. Ibid.

national style, but also his entrance into the realm of serialism. The intermingling of these two techniques solidified Ginastera's international reputation.<sup>37</sup>

In 1962, Ginastera took on a leadership position at the newly founded Latin American Centre for Advanced Musical Studies at the Instituto Torcuato di Tella. With his new position, Ginastera was able to offer two-year fellowships to young Latin American composers. The fellowships included the study of avant-garde techniques and a faculty of noteworthy composers including Copland, Dallapiccola, Messiaen, Nono, and Xenakis. Ginastera's involvement with the music center influenced not only the younger generation of composers, but also his own music. His compositional style employed contemporary techniques including serialism, non-retrogradable rhythms, and microtones.<sup>38</sup>

After dealing with a divorce in 1969, Ginastera remarried in 1971 to the Argentine cellist Aurora Nátola. Upon marriage, the couple moved permanently to Switzerland. Ginastera's years in Switzerland were extremely productive; his time was wholly devoted to composition.<sup>39</sup>

In the late 1960s, Ginastera categorized his music into three stylistic periods: objective nationalism (1934 – 1947), subjective nationalism (1947 – 1957), and neo-expressionism (1958 – 1983). Ginastera's stylistic evaluation is helpful, yet because he could not account for his compositions that had not yet been written, it fails to emphasize the originality of his later works. Recent scholars have added a fourth category: final synthesis (1976 – 1983).<sup>40</sup>

Ginastera was immensely self-critical of his music. At his insistence, many of the composer's early works were either destroyed or left unpublished. From the music that

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37. Ibid.

38. Ibid.

39. Ibid.

40. Ibid.

survived, common characteristics can be found that collectively form an objective nationalistic style.<sup>41</sup> These characteristics represent two cultural threads that were present in Argentina at the time: French and Italian prevalence, and Argentine nationalism.<sup>42</sup>

Ginastera employed many of the rules established by Aguirre to indicate Argentine nationalism in his music: melodies rooted in pentatonic scales, native dance rhythms, textures implicative of the guitar, an affinity for the interval of a third, bimodality, and the permutation of a motive as a means of unification within a given piece.<sup>43</sup> Ginastera's melodies are also representative of native folk music in that they follow the typical phrase structure,<sup>44</sup> they have a narrow range, and they are doubled at the interval of a third.<sup>45</sup> His harmonies often include triadic, quartal, polytonal, and added-second chords.<sup>46</sup> The voiceleading in his cadences model those of the Inca: fa-me-do.<sup>47</sup>

In terms of European tendencies, the most overt feature in Ginastera's music is formal structure. He used ternary, rondo, theme and variations, and song cycle forms.<sup>48</sup> He also incorporated quick arpeggiated passages implicative of Impressionistic trends, ostinatos, and Romantic harmonies such as augmented chords and delayed resolutions.<sup>49</sup>

The music from the second period, which Ginastera called "subjective nationalism," illustrates the composer's shift in attention from nationalism to the integration of national and

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41. Deborah Schwartz-Kates. "Alberto Ginastera," *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/11159> (accessed October 8, 2010).

42. David Wallace. *Alberto Ginastera: An Analysis of his Style and Techniques of Composition* (Diss., Northwestern University, 1964), pp. 6-10.

43. Deborah Schwartz-Kates. "Alberto Ginastera," *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/11159> (accessed October 8, 2010).

44. A two-measure motive followed by a two-measure repetition

45. David Wallace. pp. 23-24, 61.

46. *Ibid.*, pp. 31, 62, 69.

47. *Ibid.*, pp. 22-23.

48. *Ibid.*, pp. 23, 38, 71, 100.

49. *Ibid.*, pp. 60, 62.

international idioms.<sup>50</sup> Instead of writing melodies based on pentatonic scales, melodies tend to embellish the tonic and dominant and reflect the style of the Italian aria.<sup>51</sup> However, Ginastera used other techniques to create an Argentine atmosphere: intervals of thirds and fourths, doublings at the third, narrow range, and timbre.<sup>52</sup> His harmonies often incorporated the “guitar chord,” a chord consisting of the notes of the open strings of the guitar (E-B-G-D-A-E). His rhythms remained deeply rooted in Argentine dance music, yet in this stylistic period he incorporated rhapsodic and rubato sections that were also indicative of the Argentine region.<sup>53</sup>

The music from Ginastera’s third compositional period strays from any devotion to nationalism and instead emulates techniques from the Second Viennese School. His music, with its loose adherence to a row, reflects his belief that serialism was a tool used to achieve musical expression. Having been freed from tonal harmony, Ginastera began to favor polyphony over homophony. Additionally, he began to experiment with extremes in range.<sup>54</sup>

The fourth musical period has received the least amount of attention in recent research. Yet, one conclusion can be drawn: the period is a synthesis of the three previous stylistic periods. Ginastera, to varying degrees, combined the avant-garde with Argentine nationalism. Interestingly, Ginastera continued to employ Argentine dance rhythms.<sup>55</sup>

The *Sonata No. 1 for Piano Op. 22* (1954), *Sonata No. 2 for Piano Op. 53* (1981), and *Sonata No. 3 for Piano Op. 54* (1982), then, are examples of Ginastera’s first and last

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50. Deborah Schwartz-Kates. “Alberto Ginastera,” *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/11159> (accessed October 8, 2010).

51. David Wallace. pp. 128-131.

52. Ibid., pp. 129, 133, 136, 140.

53. Deborah Schwartz-Kates. “Alberto Ginastera,” *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/11159> (accessed October 8, 2010).

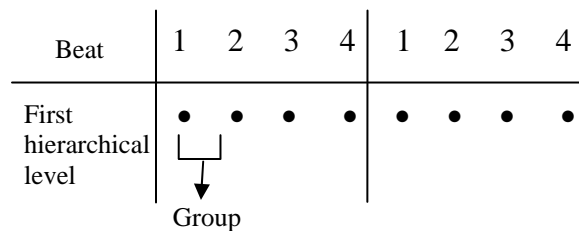
54. David Wallace. pp. 308-309, 319-321.

55. Michelle Tabor. “Alberto Ginastera’s Late Instrumental Style,” *Latin American Music Review* 15/1 (Spring-Summer, 1994), pp. 1-4.

compositional periods. All three sonatas contain examples of Argentine dance rhythms especially the malambo and the gato. The Incan rhythmic cells can be found in the sonatas as well. Yet, the identification of these rhythms within the music is not sufficient to fully understand Ginastera's rhythms and meters in his piano sonatas. An analysis of his manipulation of such rhythms is important as well. The present study attempts to explain Ginastera's use and alteration of these rhythms using Western analytical tools

## CHAPTER II: METRIC HIERARCHY AND PERIODICITY

In the 1980s, Fred Lerdahl and Ray Jackendoff developed a hierarchical system for analyzing rhythm and meter.<sup>56</sup> According to their theory, the fundamental component of understanding music is the grouping of smaller elements into larger elements.<sup>57</sup> Elements are identified by beats, or points in time.<sup>58</sup> Because a beat occurs in time and has a duration, it must be recognized regardless of whether or not it marks the beginning of a note. A dot is used to indicate the occurrence of a beat, as shown in *Figure 4*.



**Figure 4: Visual representation of the beat within a metrical hierarchy**

At this level of metric hierarchy, each group is represented by the duration from one beat to the next.

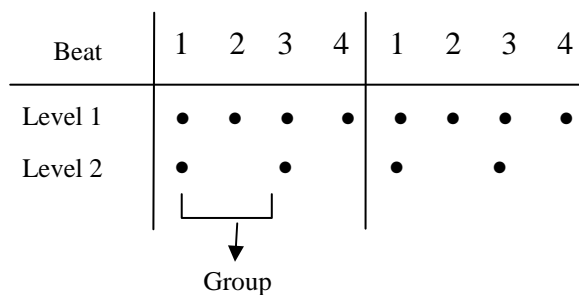
The second level of metric hierarchy is determined by the relationship of one group to the next in the first level. If the first group (beat one) is stronger than the second group (beat two), then the second level combines the two beats into one group that begins on beat one (the strong

56. Fred Lerdahl and Ray Jackendoff. *A Generative Theory of Tonal Music* (Cambridge: The MIT Press, 1983).

57. *Ibid.*, p. 13.

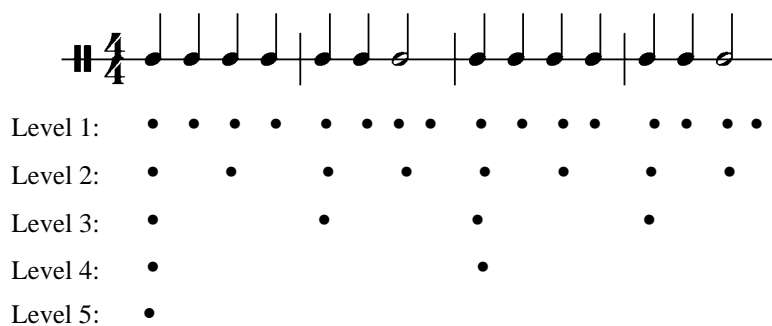
58. *Ibid.*, pp. 18-21.

beat). If the same is true of the relationship between beats three and four, then the second level would look like *Figure 5*.



**Figure 5: The first and second levels of metric hierarchy**

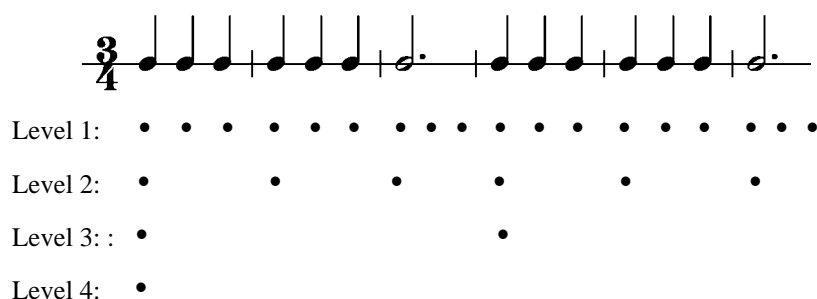
Just as the second level groups two adjacent groups together from the previous level, the third level groups adjacent groups from the second level. This pattern from one level to the next continues until the entire piece or movement is a single level.<sup>59</sup> *Figure 6* illustrates the first five levels of metric hierarchy for two two-measure phrases.



**Figure 6: First five hierarchical levels**

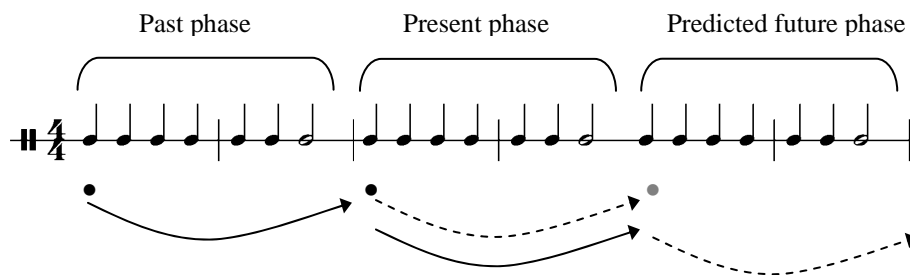
<sup>59</sup> It is possible to use the subdivision of the beat at the lowest level of metric hierarchy.

In the fourth level of metric hierarchy each phrase becomes one group; in the fifth level the two phrases join to form a period. Metric hierarchy is similar in triple meter. *Figure 7* shows the first four levels of hierarchy in two three-measure phrases.



**Figure 7: First four hierarchical levels in triple meter**

In the late 1990s, Christopher Hasty expanded on Lerdahl and Jackendoff's theory.<sup>60</sup> Hasty addressed the periodic property within meter. When it is envisioned as the consistent repetition of a particular time span, meter contains a periodic property. A period, or in Hasty's words a "phase,"<sup>61</sup> is the time span between two points in time. The regular succession of periods creates periodicity within the meter. When a meter's periodicity is known, the meter's future phases can be predicted based on past and present phases. Look at *Figure 8*.



**Figure 8: Hasty's theory of periodicity**

60. Christopher Hasty. *Meter as Rhythm* (Oxford: Oxford University Press, 1997).

61. Hasty uses "phrase" instead of "group", however the terms are synonymous here.



The first phrase in *Figure 8* represents a phase that has already occurred. Because the present phase is currently sounding, the duration of the first phrase is known. The known duration establishes, for the listener, an expectation for another phase of the same duration. Once the present phase confirms the duration of the past phase, it can then predict the next phase. This “prediction” becomes the meter’s periodicity.<sup>62</sup>

When applying the metric hierarchy and periodicity theories to Alberto Ginastera’s piano sonatas, a great deal is revealed about his use of meter. Surprisingly, there are not many instances of both periodicity and metric hierarchy occurring simultaneously. One example of this is found in a malambo rhythm in mm. 91-102 of *Sonata No. 3*. See *Figure 9*.

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62. Ibid., pp. 3-9.



measure. The fourth level signifies the start of a new phrase; the beginning of each phrase is metrically stronger than any other part of the phrase.

*Figure 9* concomitantly demonstrates the first three periodic phases of levels three and four. The listener uses the duration of measure 91 to predict the duration of measure 92. Because each measure in this section is in the same meter and has the same strong-beat (beat one) as displayed by Lerdahl and Jackendoff's theory, periodicity exists. Similarly, because each phrase in this section is of equal length and has the same strong-beat (the first beat of the phrase), periodicity at the fifth hierarchical level exists. It is possible for the listener to predict future measures and phrases based on the established periodicity created by past and present measures and phrases.

The metric hierarchy and periodicity models also reveal, in Ginastera's piano sonatas, metric characteristics that are similar to Debussy's music. Ginastera was introduced to Debussy's music when he was a student at the National Conservatory of Music. Debussy's influence had a big impact on the young composer of only twenty years.<sup>63</sup> Ginastera adopted Debussy's ability to manipulate rhythm and meter into a quasi-improvisational texture. In such a texture, the listener is not drawn to the meter or individual notes.<sup>64</sup> Ginastera uses this textural technique in *Sonata No. 1, mvt. II*. See *Figure 10*.

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63. Gilbert Chase. "Alberto Ginastera: Argentine Composer," *The Musical Quarterly* 43/4 (Oct., 1957), p. 440.

64. Jann Pasler. "Impressionism," *Grove Music Online*. *Oxford Music Online*, <http://www.oxfordmusiconline.com/subscriber/article/grove/music/50026> (accessed October 8, 2010).

Meas. 1                      2                      3                      4

**Presto misterioso** ♩ = 160

*pp*

5                      6 *8va*-----                      7                      8                      9

10                      11                      12                      13 *8va*-----                      14

**Figure 10: mm. 1-14 of *Sonata No. 1 for Piano, mvt. II***

The opening tempo of the movement is ♩ = 160, a perceptible tempo to the listener. However, the only rhythmic duration available from which to obtain a sense of meter is the eighth-note at a tempo of 480. This tempo is difficult for the listener to hear, and as a result the first level of metric hierarchy cannot be ascertained. Since each level of hierarchy beyond the first level can only be created from a previous level, no hierarchical levels can be established. The meter is further diluted by melodic contour and a lack of dynamics. The pitch contour does not emphasize the start of a new measure or phrase, and the dynamic remains at pianissimo throughout the entire fourteen measures. Therefore, the listener cannot determine the meter or periodicity.

Ginastera also integrated Debussy's idiom of disguising the bar line into his music. Debussy once said to one of his teachers, "Rhythms cannot be contained within bars."<sup>65</sup> In the *Sonata No. 2, mvt. II*, Ginastera went so far as to use dotted bar lines. At "measure" 9, Ginastera again employed a fast tempo in order to avoid a metric pulse. See *Figure 11*.

Meas: 9                      10                      11                      12                      13

**Scorrevole** ♩ = 120

14                      15                      16                      17                      18

**Figure 11: mm. 9-18 of *Sonata No. 2 for Piano, mvt. II***

Ginastera went to great lengths to abolish all notions of meter in "measures" 9-18. Embedded within the eighth-note tremolos are two transpositions of a four-note motive. *Figure 11* identifies each occurrence of the motive in measures 9-18. The transposition of the motive in the right hand is motive "x;" the transposition of the motive in the left hand is motive "z." Each

65. Glenn Watkins. *Soundings: Music in the Twentieth Century* (New York: Schirmer Books, 1988), p. 75.

In other sections of Ginastera's piano sonatas, some levels of metric hierarchy are periodic while other levels are not. The fourth movement of *Sonata No. 1* is one example. See *Figure 12*.

**Figure 12: mm. 74-77 of *Sonata No. 1 for Piano, mvt. IV***

Periodicity is established in the first level by the evenly placed sixteenth-notes. However, the second hierarchical level contains uneven groups. This uneven grouping does not allow periodicity to take place. *Figure 12* identifies the points at which periodicity is destroyed. The

first instance is on the fourth sixteenth-note of measure 75. Based on the established periodicity, the note should be a weak beat. Yet, the third sixteenth-note begins a new pattern of strong and weak beats. Once the second sixteenth-note of measure 76 is heard as a weak beat instead of a strong beat, the periodicity is again destroyed. Interestingly, the note that destroys each periodic pattern is the same note that it would have been had the note continued the pattern. Though, in the context of the whole measure, the note has altered its purpose. From this perspective, these notes could be considered “pivot notes” because they serve two functions.

The third level of metric hierarchy regains periodicity. Because higher levels of hierarchy are created by grouping lower levels, it seems unlikely for a higher level to maintain periodicity when a lower level cannot. However, the duration from one downbeat to the next remains the same, thus periodicity is reinstated as a result of periodicity from level 1 instead of level 2. It is possible, then, for the listener to hear periodicity both destroyed and continued simultaneously.

A similar issue occurs in the first movement of the same piece. Look at *Figure 13*.

Meas: 52            53            54            55            56            57            58            59

Level 1:   • • • • •   • • • • •   • • • • •   • • • • •   • • • • •   • • • • •   • • • • •   • • • • •

Level 2:   •   •   •   •   •   •   •   •   •   •   •   •   •   •   •   •   •   •

Level 3:   •            •            •            •            •            •            •            •

Level 4:   •                            •                            •                            •

**Figure 13: Melody in mm. 52-59 of *Sonata No. 1 for Piano, mvt. I***

In measures 52-59, the eighth-note beat represented by the first level remains intact, but the time signature rotates between 6/8 and 5/8. While the 6/8 measures are divided into two equal parts with strong beats on one and four, the 5/8 measures can only be divided equally at the first hierarchical level. The intrinsic nature of the 5/8 meter does not allow it to be divided into two equal subdivisions. Regardless of the 5/8 meter, the fourth hierarchical level is made up of groups with equal durations; each group contains eleven beats. Consequently, periodicity can be heard at the first and fourth hierarchical levels, but not at the second and third levels.

When periodicity is destroyed in the previous excerpt, a new periodicity of a different duration was temporarily established. However, the elimination of the periodicity in measures 52-59 is short-lived. In fact, after only one disruption of both the periodic duration and the new duration, the original duration is restored. Look at *Figure 14*.



Meas: 52                      53                      54                      55

Level 2

Meas: 52                      53                      54                      55

Level 3


**Figure 14: Melody in mm. 52-55 of *Sonata No. 1 for Piano, mvt. I***




Although the meter changes in measure 53, the obstruction of the periodicity in the second level cannot be heard until the downbeat of measure 54, five beats later. The periodicity is restored on the same beat that the listener finally hears the break in the periodicity.

The third level of metric hierarchy in measures 52-59 denotes the downbeat of each measure, as shown in *Figure 13*. Because the meter rotates between 6/8 and 5/8 every measure, periodicity is impossible at this level. The occurrence of a 6/8 cannot allow the listener to predict a 5/8 measure, and vice versa. *Figure 14* illustrates the denial of periodicity at the third hierarchical level.

In certain sections of the piano sonatas, hierarchical levels shift in and out of periodic regularity. One such example takes place in *Sonata No. 2, mvt. III*. See *Figure 15*.




The time signatures present in the first eleven measures of *Sonata No. 2, mvt. III* are 2/4, 8/16, 5/16, and 9/16. Because  regardless of the time signature, the first metric hierarchical level will represent the sixteenth-note.

Initially, the second hierarchical level identifies a strong beat every four sixteenth-notes. In the third measure, the periodicity is broken. The new hierarchical grouping in measure 3 is notated as 3+3+2, yet the pitch suggests 1+2+1+1+2+1. If the grouping according to pitch is divided into two equal parts, the result is two groups of 1+2+1. Such a grouping would produce the Andean rhythm . Ginastera eliminated all doubt of alluding to the  rhythm by using it in conjunction with the <sup>66</sup> rhythm, and by the “aymará”<sup>67</sup> description at the beginning of the movement. Because the 1+2+1 grouping equals four sixteenth-notes, the second hierarchical level from measures 1-2 is retained through measures 3-4.

It should be mentioned that Ginastera distorted the second level of hierarchy by changing the time signature to 8/16 and thereby changing the grouping to 3+2+2. It is possible that Ginastera altered the meter in order to weaken the listener’s expectation, and as a result, weakened the hierarchy and/or the periodicity of the Andean rhythm.

The original time signature returns in measure 5, even though the second level of metric hierarchy does not. A thirty second-note run encompasses the entire measure. In the first beat, the left hand plays seven thirty-second-notes, while the right hand plays nine thirty second-notes. In beat two, the left hand plays eight thirty second-notes, while the right hand plays ten thirty second-notes. Given that the divisions of both beats conflict with the sixteenth-note metric

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66.  is an Andean rhythm associated with the *carnavalito*.

67. Aymará is a popular native Andean language. Thomas Turino. “Quechua and Aymara,” from *The Garland Encyclopedia of World Music Volume 2: South America, Mexico, Central America, and the Caribbean*. edited by Dale Olsen and Daniel Sheehy( New York: Garland Publishing, Inc., 1998), p. 205.

pulse, and that the left hand and the right hand conflict rhythmically, the first and second levels of metric hierarchy are abolished in measure 5. However, what is most unique about measure 5 is the lack of a first metric hierarchical level altogether. The first level does not change; it simply does not exist. The third level, the downbeat, remains unaltered until the next measure.

Measures 6-7 are in 5/16 and 9/16 respectively. The change in meter alone modifies the third hierarchical level. However, the original sixteenth-note pulse is reinstated. Only three of the possible fourteen sixteenth-notes are heard within the two measures. Yet, the pulse is never contradicted by the rhythm. Following measures 6-7 is a restatement of the first four measures.

The periodicity created by the hierarchical levels in the first eleven measures is also unique. See *Figure 16*.

Meas:        1                                2                                3                                4

Ostinato aymará ♩ = 112 ( ♩ = ♩ *sempre*)

Periodicity of Level 3

No periodicity at the first and second levels of metric hierarchy

periodicity in the second level

Destruction of periodicity

Figure 16: mm. 1-11 of *Sonata No. 2 for Piano, mvt. III*

Measures 1-4 and measures 8-11 are identical, and thus have an identical periodicity. Between these two sets of four measures are three measures that deviate from the periodicity of the first three hierarchical levels. The periodicity from the first two levels of hierarchy are destroyed in measure five due to the 9:7 ratio of notes in beat one and the 10:8 ratio of notes in beat two. The listener cannot hear an underlying sixteenth-note pulse. Yet, after exactly one more periodic duration in the third level of hierarchy, the sixteenth-note periodicity is restored in measure 6. Therefore, the periodicity from one hierarchical level is retained through measure 5.

The next two measures retain the sixteenth-note periodicity, but they do not conform to the original periodicity of the second and third levels of hierarchy. Instead, the second level establishes a new periodicity with a dotted eighth-note duration. This periodicity begins on beat two of measure 6 and does not end until the downbeat of measure 8. Thus, only one original periodicity is present at any given time in measures 5-7, and the original periodicity in measure 5 is different from that of measures 6-7. It is difficult but not impossible, then, for the listener to hear metric regularity and stability.

Another example of metric irregularity occurs in mm. 118-121 of *Sonata No. 1, mvt. I*. See *Figure 17*.



While each measure is in a different time signature, the eighth-note gets the subdivision in all four measures. The first level of hierarchy represents the eighth-note, and the periodicity of the eighth-note duration remains constant throughout the four measures.

The second level of metric hierarchy is in groups of two and three eighth-notes. Measures 118, 119, and 121 each contain two groups from the second hierarchical level. However, measure 120 has three groups (3+3+3). Because the third hierarchical level represents each measure, the grouping for the third level is 2+2+3+2.

In level two, periodic regularity exists, yet it is not as stable as it is in the first level. The periodicity is broken in measure 119. However, the break cannot be heard until beat four of measure 119, creating a “pivot chord” effect on beat three. A similar break in periodicity occurs in measure 121.

Level three does not establish periodicity. Each group in the third level is a different duration. The resulting effect of the periodicity of the first three levels of metric hierarchy is a meter that becomes less predictable the more it is grouped into larger metric levels. When the listener focuses on small units of time, the meter is predictable; when the listener listens to large units of time, the meter is not predictable.

As the metric hierarchy and periodicity theories illustrate, Ginastera gave the listener varying degrees of metric regularity. Occasionally, the composer offered a very predictable meter, in order to establish the listener’s expectation. In other instances, periodicity can be found in some, but not all hierarchical levels which denies expectation. The result is a partially stable meter. And at other times, Ginastera only vaguely alluded to meter, leaving the listener without any sense of metric stability.





### CHAPTER III: CONSONANT AND DISSONANT RHYTHMIC ENVIRONMENTS

The music of Béla Bartók played a pivotal role in Ginastera's compositional style. In his *Homage to Béla Bartók*, Ginastera reminisced about his first encounters with Bartók's music:

On one of these occasions I heard Bartók's *Allegro barbaro* for the first time, played by Rubinstein. I felt then the impact of the discovery, the bewilderment of a revelation. I was 15 years old at the time.

My living in South America was a logical reason for my testing the influence of that continent's folkloric music – but, even in the works of pure creation, the simplicity of its harmonization, the elementary innocence of its elaboration, the lack of strong structural development, were not suited to the future I dreamed of as a composer. The *Allegro barbaro* filled in the gaps I felt in my conception of forging a national music. The rhythmic strength of that admirable piece – ‘the feverish excitement produced by the repeated primitive themes’, in Bartók's words; the construction of the melody from cells and repetition of parts of those cells; the impression that a new kind of pianism appeared here, even if superficially it could be considered a development from Liszt, its main changes being in the percussive element and new fingerings...<sup>68</sup>

According to Ginastera, Bartók's influence allowed Ginastera to manipulate folkloric elements in new ways; he adopted Bartók's “rhythmic strength” and “percussive element.”<sup>69</sup>

The most noticeable Bartókian characteristic in Ginastera's music is a driving ostinato rhythm.<sup>70</sup> In the piano sonatas, ostinato sections are frequent. One of the most obvious sections occurs in *Sonata No. 2, mvt. III*. As discussed in Chapter II, the first four measures of the movement consist of two native Andean rhythms:  and . The “Ostinato” marking at

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68. Panufnik, Andrzej, and Alberto Ginastera. “Homage to Béla Bartók,” *Tempo New Series* 136 (Mar., 1981), pp. 3-4.

69. *Ibid.*, p. 4.

70. Deborah Schwartz-Kates. “Alberto Ginastera,” *Grove Music Online*.  
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/11159> (accessed October 8, 2010).

the beginning indicates that the Andean rhythms should be used to create a constant driving rhythmic character.

Another ostinato section takes place in *Sonata No. 1, mvt. IV*. Again, Ginastera applied an ostinato character to a folk rhythm. The style marking, “Ruvido ed ostinato,” means “rough and obstinate.” The time signature rotates every measure between 3/8 and 6/16, and as a result, the grouping rotates every measure between 3+3 and 2+2+2. The juxtaposition of a duple and triple meter is a Spanish-derived technique called *sesquiáltera*. The triple and duple meters can either alternate or overlap with one another.<sup>71</sup> *Sesquiáltera* is a typical characteristic of most Argentine dances.<sup>72</sup> In this movement, Ginastera uses the *sesquiáltera* to give the ostinato an Argentine character. Whereas ostinato rhythms are usually very repetitive, here the repetition is the alteration between duple and triple meters.

Another Bartókian feature that Ginastera utilized in the piano sonatas is the simultaneous existence of contrasting rhythmic environments. In her thesis on Bartók,<sup>73</sup> Kate Gargiulo applied Ernő Lendvai’s tonal axis theory to rhythm. Lendvai identified consonant and dissonant tonal environments within Bartók’s music. Gargiulo used Lendvai’s theory to identify consonant and dissonant rhythmic environments within Bartók’s string quartets.

While Gargiulo applied the consonant/dissonant model to Bartók’s rhythms and created many helpful terms to aid her in her analysis, she also drew on the work of Harald Krebs. Krebs defined rhythmic consonances dissonances as rhythms that “sounded together” and rhythms that

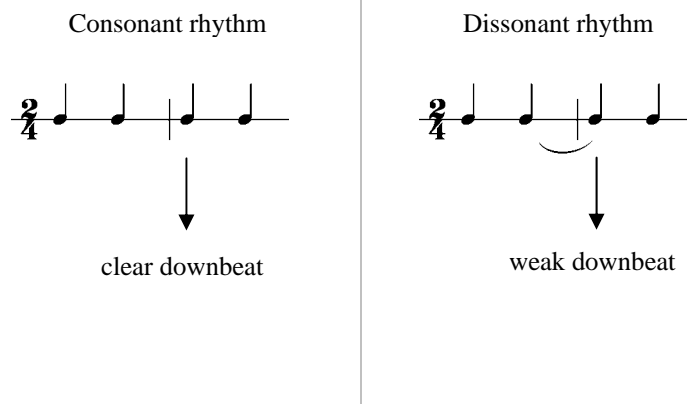
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71. Dale Olsen and Daniel Sheehy, editors. *The Garland Handbook of Latin American Music*, 2<sup>nd</sup> edition (New York: Routledge, 2008), p. 510.

72. Nicolas Slonimsky. *Music of Latin America* (New York: Thomas Y. Crowell Company, 1945), p. 74.

73. Kate Gargiulo. *Rhythmic Emancipation, Confrontation, and Triumph: An Analysis of String Quartets Nos. 1 and 4 by Béla Bartók* (Thesis, University of Central Florida, 2007).

did “not sound together,” respectively.<sup>74</sup> Gargiulo defined rhythmic consonance as a rhythm that exists in conjunction with the established meter. Likewise, she defined rhythmic dissonance as a rhythm that weakens the established meter. See *Figure 18*.



**Figure 18: Gargiulo's rhythmic consonance and dissonance theory**

The consonant rhythm accentuates the meter by simply articulating the beats, especially the downbeat. While the dissonant rhythm articulates some of the metric beats, its syncopation weakens the meter and creates dissonance between the meter and the rhythm.<sup>75</sup>

Often, rhythmic consonances and dissonances are part of larger consonant and dissonant sections, or environments. Rhythmic environments are made up of rhythmic planes. Planes may be comprised of any number of voices, but they are separate layers of music that have their own particular metric grouping. A homorhythmic section, for example, has only one rhythmic plane;

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74. Harald Krebs. “Some Extensions of the Concepts of Metrical Consonance and Dissonance,” *Journal of Music Theory* 31/1 (Spring, 1987), pp. 101.

75. Kate Gargiulo. pp. 24-25.

a three-part fugal section, however, has three rhythmic planes, regardless of whether the planes contain consonant or dissonant rhythms. A rhythmic environment can be made up of a large number of rhythmic planes or only one rhythmic plane. When all of the rhythmic planes in an environment are consonant, the existing rhythmic environment is considered consonant. If a dissonant rhythmic plane enters while the consonant rhythmic planes still exist, the rhythmic environment is then considered dissonant. A dissonant environment only returns to a consonant environment when either the consonant or dissonant planes disappear.<sup>76</sup>

In the piano sonatas, Ginastera uses rhythmic environments to create varying degrees of rhythmic consonance and dissonance. In *Sonata No. 1, mvt. II*, the dissonant plane weakens the forward movement of the consonant environment, though it does not become the new consonant environment. See *Figure 19*.

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76. Ibid., p. 39.

Consonant-only environment

Meas: 46 47 48 49 50

51 52 53 54 55

56 57 58 59 60

Return to consonant-only environment

Figure 19: mm. 46-60 of *Sonata No. 1 for Piano, mvt. II*

The first forty-eight measures of the movement have only one rhythmic environment, and for the most part, only one rhythmic plane. In measure 49, a second rhythmic plane begins in the right hand. The new rhythmic plane contains a rhythm that is dissonant to the original rhythmic environment, and consequently, it creates a dissonant rhythmic environment. The dissonant rhythmic environment lasts only a short time and ends a measure later, yet, the dissonant environment returns every other measure (measures 51, 53, 55). The result is similar to *sesquiáltera*, except that the 6/8 pattern is retained in the left hand instead of changing, and the alteration between measures in the right hand is short lived. When the dissonant plane reenters in measure 55, it lasts for three measures instead of just one. By occupying three successive measures, the dissonant rhythmic plane gives the listener the impression that it will gradually become a new consonant environment, however, the momentum of the dissonant plane is broken in measure 58 when the syncopation ends and the consonant environment continues.

The dissonant plane returns later in the movement (measures 109-114, and 144-154), however, Ginastera never allowed the dissonant plane to prevail over the consonant environment and become the new consonant plane. In this movement, the purpose of the dissonant rhythmic environment is to skew forward momentum of the consonant environment.

In the third movement, the dissonant environment plays a larger role. The third movement has an ABA form with a B section that is almost as long as both of the A sections combined. The A sections have a 5/4 time signature, and their consonant rhythmic environments are never impeded. The B section is in 2/2 time. Over the course of the B section, a dissonant 6/4 meter gradually invades the 2/2 meter and eventually becomes a new consonant environment. At the end of the B section, the 2/2 meter returns. See *Figure 20*.

Meas: 21 22 23 24 25

poco rall. a Tempo

p lirico poco cresc.

26 27 28 29

p crescendo

Rhythmic dissonance

Rhythmic dissonance

**Figure 20: mm. 21-29 of *Sonata No. 1 for Piano, mvt. III***

The B section, marked by the *a Tempo* and the 2/2 time signature, begins in measure 21. The first five measures establish the new consonant rhythmic environment (2/2 meter). In measure 28, the left hand plays a descending quarter-note triplet figure. Because the quarter-note triplets weaken the consonant rhythmic environment, they act as a dissonant plane. In the next measure (measure 29), an inner voice continues the quarter-note triplets, followed by the upper voice on beats 3-4.

In measure 30, a new rhythmic plane begins. See *Figure 21*.

The image displays a musical score for measures 30 through 33 of the third movement of Sonata No. 1 for Piano by Ginastera. The score is written for piano, with a treble and bass staff. Measure 30 is marked 'Meas: 30' and 'f agitato'. Measures 31, 32, and 33 are numbered above the staves. Brackets above and below the staves indicate harmonic planes: 'Dissonant' for measures 30-31, 'Consonant' for measure 31, 'Dissonant' for measure 32, 'Consonant' for measure 33, and 'Consonant/Dissonant' for measures 30-31 and 32-33. The left hand plays eighth-note sextuplets. The right hand plays a melody with various intervals. The score includes dynamic markings like 'f agitato' and 'cresc. molto'.

**Figure 21: mm. 30-33 of *Sonata No. 1 for Piano, mvt. III***

The left hand plays eighth-note sextuplets. Because the sextuplets fit into both the 2/2 meter and the 6/4 meter, this rhythmic plane fits into both the consonant and dissonant rhythmic planes. By writing a rhythmic plane that is both consonant and dissonant, Ginastera did not allow the dissonant planes to become dominant over the consonant planes, or vice versa.

In measure 31, the left hand continues with sextuplets, but the rhythm slightly changes. The rhythmic plane changes notes on the second half of beat one, emphasizing the consonant



rhythmic plane. Yet, it does not change on beat two, thereby emphasizing the dissonant rhythmic plane. The remainder of the measure supports the dissonant rhythmic plane.

Measure 32 returns to the consonant rhythmic environment in both hands. The rhythmic plane in the right hand is in 2/2 time. The rhythmic plane in the left hand changes from sextuplets to sixteenth-notes, thus accentuating the 2/2 meter. However, the dissonant triplet grouping returns in measure 33 as a consonance because it is not accompanied by a duple rhythm. The right hand plays quarter-note triplets on beat one, and although the plane goes back to the consonant rhythm in beat two, the rhythmic plane in the left hand changes to sixteenth-note sextuplets on beat four. The sextuplets comply with both the consonant and dissonant rhythmic planes.

In measure 34, the two rhythmic planes combine into one homorhythmic section. See *Figure 22*.

Meas: 34 35

Consonant Dissonant New rhythmic plane Consonant

**Figure 22: mm. 34-35 of *Sonata No. 1 for Piano, mvt. III***

While measures 34-35 are completely consonant, beat one of the homorhythmic section contains the previously consonant duple rhythm, but beat two contains the previously dissonant triplet rhythm. Therefore, the single rhythmic plane alternates between previously perceived dissonant

and consonant rhythms, while maintaining a consonant environment. The downbeat of measure 35 contains eighth-note quintuplets. The quintuplets conflict with both the consonant and dissonant rhythmic planes and instead create a metered *accelerando*. The consonant rhythmic plane returns in the second beat of measure 35, but it quickly yields to the quintupal division in the following measure.

After measures 37-39 repeat, with an almost verbatim repetition of measures 34-36, the dissonant rhythmic plane finally becomes the new consonant rhythmic environment. See *Figure 23*.

Meas: 40 41 42 43 44

2/2 as dissonant rhythm

molto agitato

“6/4” as consonant rhythm

45 46 47 48 49

2/2 as dissonant rhythmic plane

rallentando

molto

pp e diffuso col ped.

“6/4” as consonant rhythmic plane

2/2 becomes consonant rhythmic environment

50 51 52 53 54 55 56

rall.

Figure 23: mm. 40-56 of *Sonata No. 1 for Piano, mvt. III*

In measures 40-44, every beat of the “6/4” meter is heard, but the 2/2 meter is heard only once in the upper voice of measure 42. Because the “6/4” meter becomes stronger than the 2/2 meter in measure 40, the 6/4 meter becomes the consonant rhythmic environment. In measure 45, the 2/2 meter returns in the right hand and creates a dissonant rhythmic environment because it contradicts the established consonant rhythmic environment. Therefore, instead of creating a

sense of stability for the listener, the 2/2 now creates a feeling of instability. In measure 47, the quarter-note triplets end and the “6/4” consonant rhythmic environment is lost. The 2/2 rhythmic environment is consonant again for the remainder of the B section.

In other sections of the piano sonatas, Ginastera used rhythmic planes that do not align with one another to create one consonant rhythmic environment. One such example can be found in *Sonata No. 1, mvt. I*. The entire first movement consistently changes meters. The only exception is a section in 6/8 time from measure 115 through measure 135. While the section never loses its consonant 6/8 rhythmic environment, the section does not always contain consonant rhythmic planes. See *Figure 24*.

6/8 consonant rhythmic planes

Meas: 115 116 117 118 119

120 121 122 123

124 125 126 127

128 129 130 131

6/8 consonant rhythmic planes

132 133 134 135

pp cresc. poco a poco

mp cresc.

mf sempre cresc.

f cresc.

mp marcato

gva

gva1

11/8

Figure 24: mm. 115-135 of *Sonata No. 2 for Piano, mvt. I*

When the time signature begins in 6/8 (measure 115), only one rhythmic plane consisting of eighth-notes exists. In measure 116, the left and right hands split into two consonant rhythmic planes. In measure 120, two dissonant rhythmic planes appear. For the purpose of discussion, the rhythmic plane in the right hand will be called “plane A;” the rhythmic plane in the left hand will be called “plane B.” The eighth-note grouping in plane A is 2+2+2, reflective of a 3/4 meter. Plane B has the same eighth-note grouping only offset from plane A by one eighth-note. Individually, planes A and B create a dissonant rhythmic environment to both the 6/8 meter and to each other. Yet, when overlapped as they are in measures 120-131, planes A and B form a consonant 6/8 rhythmic environment. The two planes rely on one another to maintain the 6/8 rhythmic environment. If planes A and B were to end at different times, the consonant rhythmic environment would be lost. However, both planes end together at measure 32. Measures 32-35 solidify the consonant 6/8 rhythmic environment.

Because planes A and B rely so heavily on one another to maintain a consonant rhythmic environment, it is important to examine why Ginastera wrote the section in two conflicting 3/4 rhythmic planes instead of one 6/8 rhythmic plane. Measures 120-131 can be broken down into three groups of four measures. Each group repeats one measure four times. In the first group (measures 121-123), the highest pitch in rhythmic plane A is one whole step lower than the lowest pitch in rhythmic plane B. Also, plane B only plays one chord. Because of both the slight difference in register between the two planes and the stagnant harmony of plane B, it is possible for the listener to hear two separate planes instead of one consonant rhythmic environment. With an exception of register, the following two groups of four measures are similar to the first group. In the second group, the registers of the two planes overlap, creating a

more consonant 6/8 sound. In the third group, plane A is now in a higher register than plane B, and the listener can again hear two separate rhythmic planes.

Bartók's music played an important role in Ginastera's compositional development. With Bartók's influence, Ginastera was able to manipulate simple folk rhythms and various meters into intricate ostinatos and rhythmic environments. Ginastera generated a new layer of conflict in his music between consonant and dissonant rhythms and meters.

## CHAPTER IV: ADDITIVE/SUBTRACTIVE PROCESS

A common feature in Ginastera's piano sonatas is the recurrence of a musical idea, such as a motive, phrase, or section, in a slightly altered form. If a motive or phrase is altered, the alteration is frequently the addition or subtraction of a note or beat. If the reappearing idea is a section, the section is often altered by the addition or subtraction of a measure.

The opening rhythmic structure of *Sonata No. 3* is the clearest example of the additive process, and thus, has been widely discussed in recent research.<sup>77</sup> See *Figure 25*.

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77. Grace Campbell. *Evolution, Symmetrization, and Synthesis: The Piano Sonatas of Alberto Ginastera* (D.M.A. Diss., University of North Texas, 1991), pp. 22-23, 51-53. Sergio De Los Cobos. *Alberto Ginastera's Three Piano Sonatas: A Reflection of the Composer and His Country* (Diss., Rice University, 1991), pp. 65-66. Claudia Knafo. *Tradition and Innovation: Balances Within the Piano Sonatas of Alberto Ginastera* (Diss., Boston University, 1994).



The musical score is divided into four systems, each with measures numbered 1 through 13. The first system (measures 1-4) includes the labels 'Introduction' (measure 1), 'First phrase' (measures 2-3), and 'Phrase extension' (measure 4). The tempo is marked 'Impetuosamente' with a metronome marking of 138 (sempré). The dynamics are marked 'ff deciso'. The second system (measures 5-7) includes 'Repetition of first phrase (up a 2<sup>nd</sup>)' (measures 5-6), 'Added material' (measure 6), and 'Extended phrase extension' (measure 7). The third system (measures 8-10) includes 'Repetition of first phrase (up a 3<sup>rd</sup>)' (measures 8-9) and 'Added material' (measure 10). The fourth system (measures 11-13) includes 'Extended phrase extension' (measures 11-12) and 'Added material' (measure 13). The score features various time signatures (3/8, 4/4, 5/8, 9/8, 8/8) and musical notations such as slurs, accents, and dynamic markings.

**Figure 25: mm. 1-13 of Sonata No. 3 for Piano**

The piece begins with a three-note introduction in 3/8, followed by a three-measure phrase. The phrase consists of one measure in 4/4, one measure in 5/8, and a one-measure phrase extension in 5/8. Measures 5-6 repeat the first phrase (measures 2-3) with four extra eighth-notes added at the end. As a result, measure 6 is in 9/8 instead of 5/8. The phrase extension in measure 4 is

also repeated in an extended version in measure 7. The extension, however, only extends by two eighth-notes, creating a 7/8 meter. The phrase is further extended when it reappears for the third time in measures 8-11. The phrase is extended by another four eighth-notes; the phrase extension is extended by another two eighth-notes.<sup>78</sup>

The meter changes in the first eleven measures are irrelevant, in and of themselves. See

Figure 26.

Meas: 1 2 3 4

Impetuosamente ♩ = 138 (sempre ♩ = ♩)

ff deciso

Motive

Right hand: ■ ■ ■ (■) (■)

Left hand: □ □ □ (□) (□)

Meas: 5 6 7

Right hand: □ □ □ □ (□) (□)

Left hand: ■ ■ ■ ■ (■)

Figure 26: mm. 1-7 of *Sonata No. 3 for Piano*

Because every eighth-note division within each phrase, with an exception of the downbeat of measure 6, is accented and four-note motives often cross the bar lines, the meter does not create

78. Grace Campbell. *Evolution, Symmetrization, and Synthesis: The Piano Sonatas of Alberto Ginastera* (D.M.A. Diss., University of North Texas, 1991), pp. 22-23, 51-53.

a metric hierarchical level. However, the four-note motives do create a metric hierarchical level. The additive process does not destroy the level's periodicity because the added portion has the same duration as one cycle of the periodicity.

The extension of the phrase extensions is also important. If the periodicity of the four-note motive in the left hand were to continue through the phrase extension, the first occurrence of the four-note motive (in the right hand) in the next phrase would become part of the same periodicity. See *Figure 27*.

Meas: 5                      6                      7

Right hand: □ □ □ □ (□) (□)

Left hand: ■ ■ ■ ■ (■)

8                      9                      10                      11

Right hand: □ □ □ □ □ (□) (□) (□)

Left hand: ■ ■ ■ ■ ■ (■) (■)

**Figure 27: mm. 5-11 of *Sonata No. 3 for Piano***

If the periodicity of the motives from the rhythmic planes of both the left and right hand were continued through the phrase extension in measure 7, they would continue the same periodicity in the third occurrence of the phrase. Consequently, the additive process in the example never destroys the periodicity.

Another example of the additive process occurs in *Sonata No. 2, mvt. III*. See *Figure 28*.

Phrase 1                      Andean rhythm

Meas:    1                      2                      3                      4

Ostinato aymará ♩ = 112 ( ♩ = ♩ *sempre*)

8va

Extension of Andean rhythm

5                      6                      7

8    Phrase 2                      9                      10                      11

8va

Extension                      Extension

12--Extension-13                      14




8va

Extension

15

Figure 28: mm. 1-15 of Sonata No. 2 for Piano, mvt. III

The first twenty-five measures are made up of a phrase that repeats twice. While each recurrence of the phrase is extended, the extension here is less predictable than the extension in *Sonata No. 3*. In the third sonata, each additional phrase was extended by the same duration. In this example, the extension is a variable duration.

The movement begins with a four-measure ostinato of a native Andean dance rhythm. The first two measures are in 2/4, and the variation of the dance rhythm () in measures 3-4, is in 8/16. At first glance, measures 3-4 do not appear to be a variation of the dance rhythm (). However, if the written grouping were re-written to 4+4 instead of 3+2+2, then the correlation would become more visible: the harmonic rhythm of the chords in each group of four sixteenth-notes is . Measure 5 is a non-glissando run in 2/4. The following measure (measure 6) is in 5/16. Initially, measure 6 sounds like a return to the Andean dance rhythm in measure 1. If the first sixteenth-note is removed from measure 6, the rhythm would be identical to measure 1. As a result, it is possible for the listener to hear measure 6 as an extended version of measure 1. However, measure 7 abruptly ends the extended Andean rhythm with a “brake”.<sup>79</sup>

Measure 8 marks the beginning of the second occurrence of the phrase. The first four measures remain unaltered. The next measure (measure 12) is in 3/16 and does not appear in the first phrase. Though, because the downbeat repeats the same chord from the previous measure, measure 12 sounds like an extension, similar to the illusion created in measure 6. Measure 13 is a non-glissando run reminiscent of measure 5. However, the duration of measure 13 is an eighth-note longer than the duration of measure 5.

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79. Ginastera often used notes with longer durations to create a quasi-cadence. Gilbert Chase refers to these moments in the music as “brakes”. Gilbert Chase. “Alberto Ginastera: Argentine Composer,” *The Musical Quarterly* 43/4 (Oct., 1957), p. 455.

It is important to note that the additional measure (measure 12) breaks the periodicity in the third level of metric hierarchy. In the first occurrence of the phrase, the periodicity of the metric downbeat is not lost until after the non-glissando run. In the second occurrence of the phrase, the periodicity is lost in the measure before the run. Therefore, the second occurrence of the run lacks the metric stability of the first occurrence of the run.

The 5/16 measure from the first phrase transforms into a 10/16 measure in the second phrase (measure 14), and the allusion to the Andean dance rhythm is lost. Interestingly, Ginastera replaced the dance rhythm with a new periodicity made up of a five sixteenth-note duration. The new periodicity explains the addition of the 3/16 measure (measure 12) that does not exist in the first phrase. Together, measures 8-11 contain thirty-two sixteenth-notes. Yet, the additional three sixteenth-notes from measure 12 make the total number of sixteenth-notes equals thirty-five, a multiple of five. The 5/8 meter in measure 13 is also divisible by five. It should be stated though, that measures 8-11 do not contain a five sixteenth-note periodicity. The measures are simply combined with measure 12 to act as a precursor to the five sixteenth-note periodicity in measure 14. Measure 15 is similar to measure 7, however an eighth-note chord is added in the second occurrence between the two chords that exist in the first occurrence of the phrase.



The musical score for measures 16-25 of Sonata No. 2 for Piano, mvt. III, is presented in four systems. The first system (measures 16-17) shows a transition from 8/16 to 1/4 + 8/16, with a forte (f) dynamic. The second system (measures 18-21) continues with 3/4, 8/16, 5/16, and 4/16 time signatures, featuring a piano (p) dynamic. The third system (measures 22-23) includes a 3/4 time signature and a 'non gliss.' marking. The fourth system (measures 24-25) shows a transition from 8/16 to 4/16, with a piano (p) dynamic. Extensions are indicated by brackets above measures 17, 20, 21, 23, and 25.

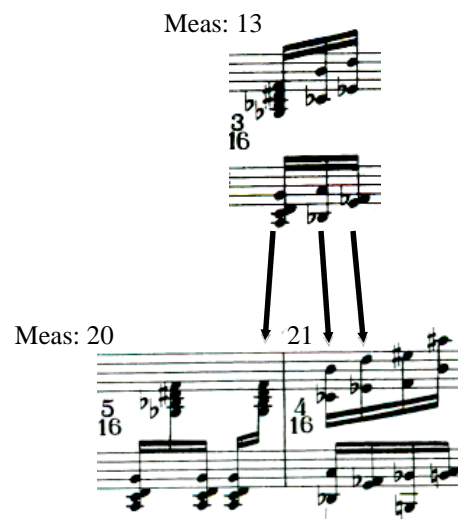
**Figure 29: mm. 16-25 of Sonata No. 2 for Piano, mvt. III**

Figure 29 shows the third occurrence of the phrase. Unlike the first and second occurrences of the phrase, the third occurrence contains a one-measure introduction. Measure 16 is in 8/16, but it does not contain the Andean dance rhythm. Measures 17-20 repeat a variation of the Andean dance ostinato with an additional five sixteenth-notes in measure 20. The duration of the periodicity in the third occurrence of the ostinato is still four sixteenth-notes. However,



the addition of the five sixteenth-notes requires one of the sixteenth-notes to be left out of the grouping (the downbeat of measure 20), and thus, destroys the periodicity near the end of the phrase.

The 3/16 measure from the second phrase returns as a 4/16 measure in the third phrase (measure 21). While only one beat is added to the measure, the downbeat of the 3/16 measure returns in the third phrase as the last beat of the measure before the 4/16 measure. As a result, each chord in measure 21 is offset by one beat, creating for the listener an illusion of two additional beats instead of just one. See *Figure 30*.



**Figure 30: mm. 12 and 20-21 of *Sonata No. 2 for Piano, mvt. III***

The non-glissando run in measure 22 increases by the same duration as the run from the second phrase. Measure 23, though, is extended by only one sixteenth-note from the second phrase. The “brake” in measures 7 and 15 from the previous two phrases is split into two measures in the third phrase; the first measure (measure 24) is in 8/16, and the second measure

(measure 25) is in 4/4. The original two chords from measure 7 are still present, as well as the additional chord from measure 15. However, the third occurrence of the phrase adds yet another chord between the two original chords from measure 7 on beat six of measure 24.

Toward the end of the movement, measures 79-100, an altered form of the opening section reappears. See *Figure 31*.

The musical score for measures 79-100 of Sonata No. 2 for Piano, mvt. II, is presented in a single system. The time signature is 2/4. The score is written for piano and includes various dynamic markings and articulation symbols. The measures are numbered 79 through 100. The notation includes various rhythmic patterns, including sixteenth and thirty-second notes, and glissandos on white and black keys. The score is written in a single system and includes various dynamic markings and articulation symbols.

Measures 79-100 of Sonata No. 2 for Piano, mvt. II. The score is in 2/4 time and features complex rhythmic patterns, including sixteenth and thirty-second notes, and glissandos on white and black keys. The notation includes various dynamic markings and articulation symbols.

Figure 31: mm. 79-100 of Sonata No. 2 for Piano, mvt. II

The original phrase recurs in measures 79-84 with two modifications. The non-glissando run is now a glissando run, though it remains in 2/4. The second modification is the absence of the 5/16 measure. The two subsequent phrases continue a similar pattern. The second and third occurrences of the phrase here repeat the second and third occurrences of the phrase in the beginning of the movement with the same two modifications as the first phrase. Consequently, measures 79-100 have both additive and subtractive qualities.

Ginastera also used the additive process in the opening of *Sonata No. 1, mvt. I*. In this movement, the additive process begins at the motivic level. See *Figure 32*.

The figure displays a musical score for the first four measures of the first movement of Ginastera's Sonata No. 1 for Piano. The score is written for piano (indicated by a grand staff with a brace on the left). The time signature is 3/4. Measures 1 and 2 are grouped under the label 'original motive A'. Measures 3 and 4 are grouped under the label 'rhythmically expanded motive A'. In the lower register, measures 1 and 2 are grouped under the label 'original motive B', and measures 3 and 4 are grouped under the label 'rhythmically expanded motive B'. The notation shows a clear additive process where the rhythmic structure of the motives is expanded in the later measures.

**Figure 32: mm. 1-4 of *Sonata No. 1 for Piano, mvt. I***

The upper register begins with a four-note motive spanning five beats (motive A, measures 1-2). The following motive, in measures 3-4, is similar to the first. There is no change in pitch,

dynamic, register, or style. The only change that Ginastera made in measures 3-4 is an additional note, totaling five notes.

Complementing the upper register motive in the first four measures is a motive in the lower register (motive *B*). After the right hand plays its first motive, the left hand enters in measure 2 with a two-note motive that lasts for one and a half beats. The repetition of the bass motive returns as expected after the second appearance of the upper register motive; there is no delay between the motives of the upper and lower registers in measure 4. However, the repetition of the left hand motive has expanded by one beat. Interestingly, the second motive in the upper register adds one note and two beats, while the second motive in the lower register adds the opposite: two notes and one beat. The additional note in the upper register occurs on the second half of beat three in measure 3. An additional beat is added in the cadential chord, resulting in a dotted half-note instead of a half-note. The additional chords in the lower register occurs on the second half of beat two and on beat three of measure 4.

A variation of the first four measures occurs in measures 12-15. See *Figure 33*.

Meas: 12      Extension      Extension      13      14      15



**Figure 33:** mm. 12-15 of *Sonata No. 1 for Piano, mvt. I*

Although the pitches change in measures 12-15, the intervals and contour from one chord to the next are almost identical. It is important to note that Ginastera disguised the variation by altering the placement of the phrase within the meter and by adding accidentals. The first chord in measure 12 corresponds to the last chord in measure 1, thus, the anacrusis to measure 2 returns in measure 12 as a downbeat. Also, the third chord in measure 12 corresponds to the first chord in measure 2; the downbeat of measure 2 becomes a weak beat in measure 12. The second chord in measure 12 is an added eighth-note that functions as a passing chord to fill the leap of the third. If the tie in measure 3 did not exist, then the rhythm from beat 2 of measure 13 through the end of measure 15 would be identical to the rhythm in measures 3-4. What is most interesting about this variation of the opening four measures is that beat 1 of measure 13 creates an added beat between the first and second left-hand motives. However, the variation as a whole contains one less beat than the original four measures. Therefore, the variation is simultaneously additive and subtractive.

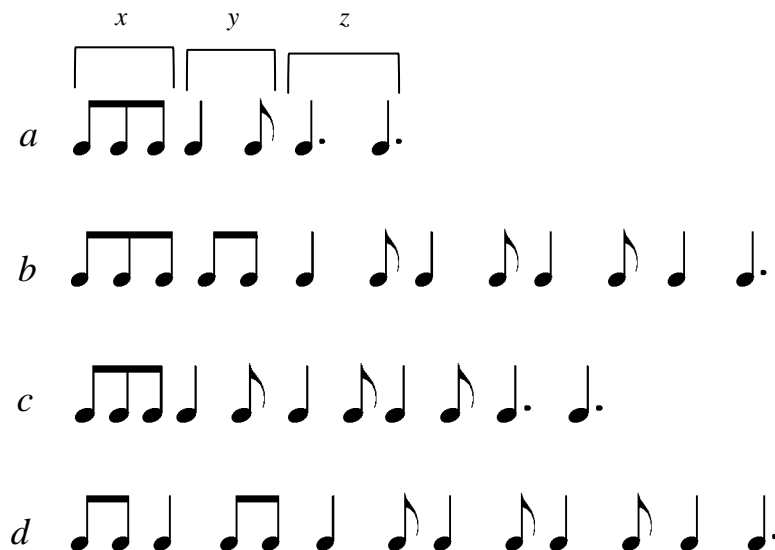
The third variation of the first four measures occurs in measures 23-25. See *Figure 34*.

The musical score for measures 23-25 of Sonata No. 1 for Piano, mvt. I, is presented in 3/4 time. The score is written for piano (p) and includes a piano introduction (p). Measure 23 features a piano introduction (p) and a piano introduction (p). Measure 24 features a piano introduction (p) and a piano introduction (p). Measure 25 features a piano introduction (p) and a piano introduction (p). The score includes a piano introduction (p) and a piano introduction (p).

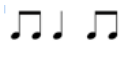
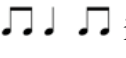
**Figure 34:** mm. 23-25 of *Sonata No. 1 for Piano, mvt. I*

Like the first variation, the second variation begins on the downbeat with what was previously the anacrusis to measure two. Here, instead of filling the leap of the third, the downbeat of measure 2 is extended by one eighth-note in measure 23. Except for the omission of the first note in measure 3, measures 24-25 are rhythmically identical to measures 3-4 and measures 14-15. Also, whereas the first variation contains an added beat between the two left-hand motives, the second variation contains one less beat between the two left-hand motives than the original.

The opening section of the first movement contains another important rhythmic idea. In this example, Ginastera was more liberal with the additive and subtractive process. *Figure 35* shows all forms of the rhythm.



**Figure 35: Rhythmic variants in the opening section of *Sonata No. 1 for Piano, mvt. I***

Because version *a* occurs first,<sup>80</sup> and the other variations succeed it, *a* will be considered the original rhythm for the purpose of this discussion. Version *a*, beginning on beat 3 of measure 7, is comprised of three parts: the opening eighth-note triplet figure (*x*), the quarter-note plus eighth-note figure (*y*), and the two-note “brake” (*z*). Each version of the rhythm contains all three parts. Version *b*, beginning in measure 9, adds two eighth-notes after *x* and repeats *y* twice. Like version *b*, version *c*, in measures 17 and 27, also repeats *y* twice. The rest of version *c* coincides with version *a*. Version *d*, beginning in measure 20, adds two repetitions of *y* as well, though it treats *x* differently than the other versions. Here, the rhythm is  beginning on beat one in 3/4 time. The rhythm, in and of itself, is not dissonant; it emphasizes each beat within the measure. However, when it immediately precedes *y* and *z*, the rhythm is then heard as a variation of *x*. The pitches of version *d* also indicate that  is a variation of *x*. The pitches in *d* are identical to the pitches in version *b* with one exception: the additional three beats in the *x* figure. Yet, the original three notes of the *x* figure match in both versions *b* and *d*. As a variation of *x*, the rhythm repeats once with a dissonance on the first beat of the repetition. Interestingly, the first occurrence of the rhythm (*a*) and the only variation of the rhythm that is heard more than once (*c*) both contain a dotted quarter-note periodicity. Version *b* does not contain a dotted quarter-note periodicity as a result of the additional two eighth-notes in its *x* figure. While the *x* figure in version *d* does contain a dotted quarter-note periodicity, it is weakened by the dissonant quarter note on beat two of measure 20. Both versions *b* and *d* negate a dotted quarter-note periodicity in their “brake” figures by reducing the first dotted quarter-note to a quarter-note (measures 11 and 22).

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80. measures 17-19, 27-29



After examining the additive and subtractive process in the piano sonatas, one might wonder if the process is a compositional technique that Ginastera developed over the course of his career. When placed in chronological order, the sonatas represent a progression of the process from mildly significant to highly refined. In the first sonata, the additive and subtractive process is unorganized and only affects the music at the phrase level. However, the process in the third sonata is very organized and is used as a means to construct the entire first section of the piece. Yet, because the sonatas represent only the first and last stylistic periods in Ginastera's compositional output, a comprehensive evaluation of Ginastera's additive and subtractive process cannot be made here

## CONCLUSION

The metric hierarchy, periodicity, consonant/dissonant, and additive/subtractive theories offer new insight into the rhythm and meter in Ginastera's piano sonatas. Fred Lerdahl and Ray Jackendoff's model of metric hierarchy identifies strong and weak beats in the piano sonatas as well as their grouping into phrases and sections. The groupings generate various levels of metric hierarchy that are then subjected to Christopher Hasty's periodicity theory. The periodicity theory illustrates the regularity and the obstruction of regularity within each level of metric hierarchy. Harald Krebs' theory on rhythmic consonance and dissonance identifies sections in the sonatas in which different rhythmic strata do not align with each other and thereby create dissonant rhythmic environments. The additive and subtractive method also identifies motives, phrases, and sections that have been repeated in a slightly altered form.

Together, all four analyses identify the listener's level of rhythmic and metric expectation. The metric hierarchy and periodicity theories draw attention to areas that thwart the periodicity of a metric hierarchical level. They also highlight the reestablishment of a broken periodicity as well as the creation of new periodicities. The rhythmic environment theory locates rhythms that enter the music but do not align with existing rhythms. Such dissonant rhythms could not have been predicted to enter based on the consonant rhythms that already existed. The additive and subtractive theory distinguishes motives, phrases, and sections that recur in the music in a different form. The listener may hear a similar idea, however the additive and subtractive process identifies points in the music in which the listener expects to hear a repetition but instead hears an added element or does not hear a portion of the first occurrence of the

musical idea. When periodicity is broken, a rhythmic dissonance appears, or a recurring event is altered, the listener's expectation is denied.

It should be noted that the order in which these theories are applied is important. The periodicity model would be difficult to employ without an understanding of metric hierarchy. Likewise, the consonant/dissonant and additive/subtractive models are more informative with an understanding of periodicity. The theories offer the most information when studied together, as opposed to a study of a larger body of music that focuses on only one theory. Thus, the current study has attempted to integrate the theories where possible.

While this paper serves as a starting point for new research in Ginastera's use of rhythm and meter, it raises questions that have not yet been answered. To gain a more full understanding of Ginastera's use of rhythmic and metric expectation and regularity, a wider scope of his compositional output must be studied. Also, this study brings to light many instances of denied expectation in the sonatas and a cognitive approach could shed further light on Ginastera's rhythmic and metric structures.

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